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1. INTRODUCTION

1.1 OBJECTIVE AND SCOPE

This Safety Assessment Document (SAD) for the LANSCE* accelerator facility at Los Alamos National Laboratory provides information and analysis to show that the operations at LANSCE can be conducted with acceptable health, safety, and environmental risks. The document was prepared in accordance with DOE Order 5480.25, "Safety of Accelerator Facilities." Screening of the facility for nuclear hazards per DOE Standard 1027 is included.

This SAD addresses those hazards that are characteristic of accelerator operations and are not routinely encountered by the public and accepted as part of everyday living. Routine risks, such as traffic, machine shop operations, and typical industrial operations were not addressed unless they involved hazardous materials or hazards related to accelerator operation.

1.2 FACILITY PURPOSE

LANSCE is an accelerator-based national user facility that provides particle beams and equipment for a broad program in basic and applied research including materials science, nuclear physics, and biophysics. The program includes a strong mission alignment with DOE Defense Programs and DOE Energy Research. In addition and on a beam-available basis LANSCE produces isotopes for medical purposes.

1.3 FACILITY DESCRIPTION AND OPERATIONS SUMMARY

LANSCE is part of the Los Alamos National Laboratory, located in north central New Mexico, and is located in laboratory Technical Area 53 (TA-53). The facility can be divided into a number of areas according to their general purpose—the linac, the experimental areas, and the support areas.

The linac simultaneously produces beams of H^+ (protons) and H^- ions. The typical average beam current out of the linac near 1 mA for the H^+ beam and near 0.1 mA for H^- .

* LANSCE is the designator for the Los Alamos Neutron Science Center and includes all LANSCE-related facilities (described later). Through fiscal year 1995, the Clinton P. Anderson Meson Physics Facility was known as the Los Alamos Meson Physics Facility, LAMPF; and the Manuel Lujan Jr. Neutron Scattering Center was known as the Los Alamos Neutron Scattering Center (LANSCE), now MLNSC and a part of LANSCE.

The output energy is usually 800 MeV but can be adjusted downwards. The total beam power available is near 1 MW, very high for particle accelerators. This is advantageous for the program but challenging for safety systems.

The experimental areas are served from three main beamlines emerging from the accelerator switchyard: Line A, Line D, and Line X. Line A delivers beam to Area A, Line X feeds Areas B and C, and Line D delivers beam to the Proton Storage Ring (PSR), MLSNC, and the Weapons Neutron Research (WNR) facility.

The Line D areas are on the "south side." In standard operation, the PSR accumulates protons and delivers them to the MLSNC spallation target in one intense burst to produce pulses of neutrons. These neutrons are moderated and delivered as secondary beams to an assortment of instruments optimized for materials science, and basic and applied neutron physics. By producing the neutrons in the pulsed mode, experimenters can measure neutron energy by using time-of-flight (TOF).

Beam delivered to WNR consists of sub-nanosecond pulses that are separated by approximately microsecond durations. WNR operates with a choice of two target stations. The first is a flexible proton targeting area, the second is a wide-band (unmoderated) neutron spallation source. Again, neutron energy can be measured by TOF.

Areas B and C on the "north side," fed from Line X, are being reconfigured for DP activities.

Area A houses the partially discontinued ER Nuclear Physics program and extends into A-East where a materials science program for DP is conducted and the Isotope Production program is served.

Support areas considered in this document contain hazardous energy sources and materials associated with facility operation.

1.4 CONCLUSIONS OF THE SAFETY ASSESSMENT

Protection for site workers is provided through shielding, fencing, access controls and sweep procedures, beam interlocks, monitoring devices and dosimetry, posting, worker training, administrative controls, and emergency response capabilities. Restricted site access, site isolation, and on- and off-site monitoring give additional protection to the public. Shielding, containment, isolation, and safe storage procedures for hazardous or activated materials along with drainage and treatment systems, air emissions control and monitoring, and emergency response and cleanup procedures provide protection for the environment.

The conclusion of this SAD is that reasonable assurance exists that LANSCE operation is conducted with an acceptable level of risk for workers, the public, and the environment.